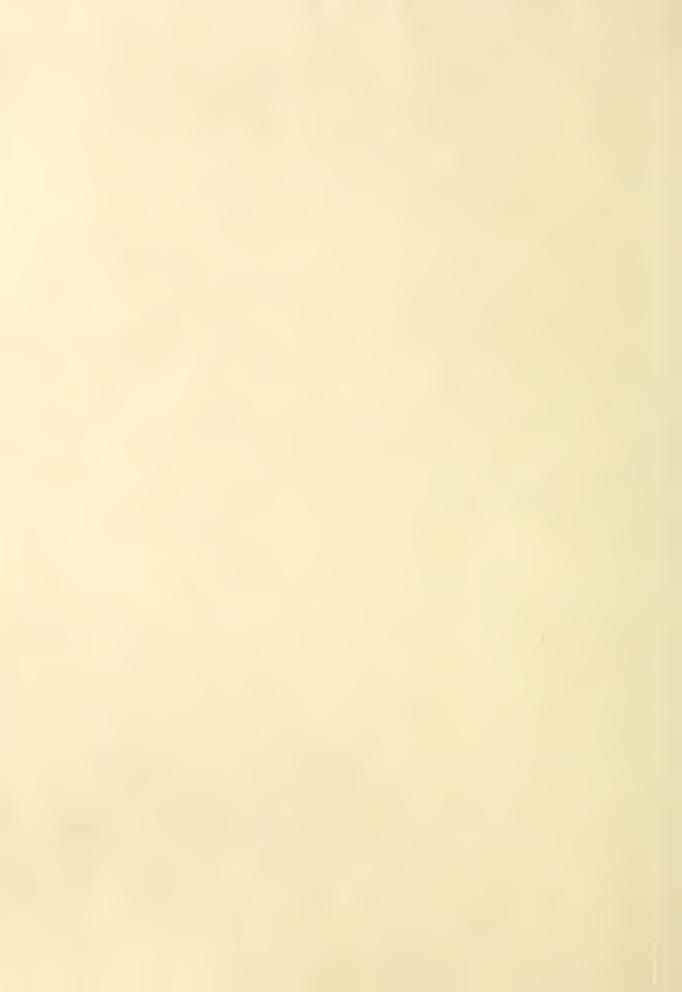
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FEDERAL - STATE COOPERATIVE
SNOW SURVEYS and WATER SUPPLY FORECASTS
for

ARIZONA

UNITED STATES DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE

Nata included in this report were obtained by the agency named above in cooperation with the Federal, State and local organizations listed on the last page of this report.

MAR. 15, 1957

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

Snow surveys in the west are conducted each year at more than 1200 snow courses. Basin and Province or State snow survey reports summarizing the results of the measurements and forecasts of seasonal runoff and water supply are issued by the Soil Conservation Service, U. S. Department of Agriculture and some of its cooperators; the Water Rights Branch of the British Columbia Department of Lands and Forests; and the California Division of Water Resources.

Copies of the various federal-state cooperative snow survey reports listed below may be secured by writing to:

Head, Water Supply Forecasting Section Soil Conservation Service 209 S. W. 5th Avenue Portland 4, Oregon

BASIN REPORTS:

Colorado, Rio Grande, and Platte-Arkansas River Basins	Issued mouthly February through May by SCS and Colorado Experiment Station, Fort Collins, Colorado.*
Columbia River Basin	Issued monthly January through May by Soil Conservation Service, Boise, Idaho.*
Upper Missouri River Basin	Issued monthly February through May by SCS and Montana Agricultural Experiment Station, Bozeman Montana.*
West-Wide Water Supply Outlook	Issued April 1 by Soil Conservation Service and Cooperators, Portland, Oregon.

STATE REPORTS:

Arizona	Issued semi-monthly January 15 through April 1 by SCS and Salt River Valley Water Users Association, Phoenix, Arizoua.*
Nevada	Issued monthly February through April by SCS and Nevada State Engineer, Reno, Nevada.* $$
Oregon	Issued monthly January through May by SCS, Portland, Oregon, and Oregon Agricultural Experiment Station.*
Utah	Issued monthly January through May by SCS, Salt Lake City, Utah, and State Engineer of Utah and Utah Agricultural Experiment Station.*
Washington	Issued monthly February through May by SCS, Spokane, Washington, and State Department of Conservation and Development.*
Wyoming	Issued monthly February through May by SCS, Casper, Wyoming, and State Engineer of Wyoming.*

^{*}Special reports are issued as needed.

The British Columbia reports are issued February 1 through June 1 and may be secured from Comptroller, Water Rights Branch, Department of Lands and Forests, Parliament Building, Victoria, B. C.

The California reports are issued monthly February 1 through May 1 and may be secured from Division of Water Resources, California Department of Public Works, Sacremento, California.

The annual water supply forecasts of the Weather Bureau are available in monthly bufletins published from January through May. These bulletins entitled, "Water Supply Forecasts for the Western United States" may be obtained from River Forecast Center, Weather Bureau, 712 Federal Office Building, Kansas City 6, Missouri.

COOPERATIVE SNOW SURVEYS AND WATER SUPPLY FORECASTS

for

ARIZONA

(Salt, Verde, Gila and part of Lower Colorado River Basin)

Issued

March 15, 1957

Report Prepared

by

George Watt, Snow Survey Supervisor Soil Conservation Service 39 North Sixth Avenue Phoenix, Arizona

Issued by

Salt River Valley Water Users! Association

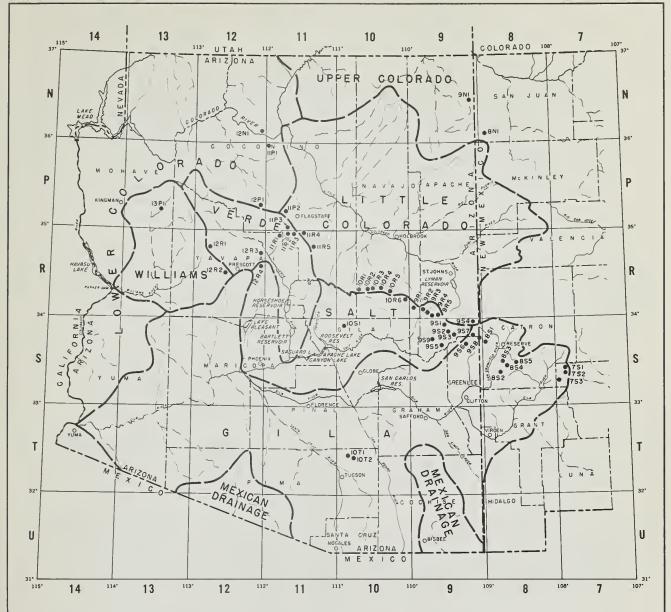
and

Soil Conservation Service

Robert V. Boyle State Conservationist

Victor I. Corbell President Soil Conservation Service Salt River Valley Water Users' Assn.

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LEGEND

DRAINAGE BASIN BOUNDARY
13U2 • SNOW COURSE

ARIZONA COOPERATIVE SNOW SURVEYS

SNOW COURSES AND DRAINAGE BASINS
JANUARY 1956



INDEX TO SNOW COURSES

NUMBER	* NAME	SEC	TWP	RGE** E	LEVATION	RIVER BASIN	
11-P -3	Antelope Park	29	19N	8E	7300	Verde Discontir	nued
9-S - 1	Baldy (p)	28	7N	27E	9000	Salt-Little Colorado	
10-T -1	Bear Wallow	6	125	16E	8100	Gila	
9 - S -6	Beaver Head	13	4N	30E	8000	Salt-Frisco	
9-5-3	Big Lake Knoll	2	5N	28 E	8800	Salt-Frisco-Little Colorado Discontir	nued
7 - S -3	Black Canyon	8	135	11W***	6790	Gila	
12-N-1	Bright Angel	34	33N	3E	8400	Lower Colorado	
12-R -1	Camp Wood	3	16N	6W	5700	Williams-Verde	
10-R -3	Canyon Creek (s)	18	11N	15E	7500	Salt	
11-R -2	Casner Park (s)	19	18N	8E	6950	Verde	
12 - P -1	Chalender (s)	27	22N	3E	7100	Verde	
8-5-3	Corner Mountain	7	105	17W***	8850	Gila-Frisco	
9-S -9	Corn Creek (p) Lat	.33045	N. Long	, 109 ⁰ 45'W	.§ 7730	Salt	
9-S-7	Coronado Trail	26	5N	30E	8000	Salt-Frisco	
10-R -2	Elk	31	11N	14E	7600	Salt-Little Colorado Discontii	nued
10-R -6	Forest Dale (s)	2	9N	21E	6000	Salt-Little Colorado	
11-P-2	Fort Valley	22	22N	6E	7350	Verde #	
9-R -5	Ft. Apache	18	7N	27E	9160	Salt-Little Colorado	
8-5-1	Frisco Divide	31	65	20W***	8000	Frisco-Gila	
12-R -4	Gaddes Canyon	11	15N	2E	7600	Verde #	
10 - R -5	Gentry	36	11N	15E	7600	Salt-Little Colorado	
11-P-1	Grand Canyon	21	30 N	4E	7500	Lower Colorado	
11-R -5	Happy Jack	30	17N	9E	7630	Verde	
10-R -4	Heber (p)	28	11N	15E	7600	Salt-Little Colorado	
7-S-2	Inman	6	115	10W***	7800	Gila	
12 - R -2	Iron Springs	22	14N	3W	6200	Williams-Verde	
9 - S -2	Maverick Fork (s)(p) 13	6N	27E	9050	Salt-Little Colorado	
9-R -4	McKay Peak	13	7N	24E	8250	Salt Not read	d
9-R -2	McNary (s)	14	8N	23E	7200	Salt-Little Colorado	
9-R -1	Milk Ranch	28	8N	23E	7000	Salt	
12-R -3	Mingus Mountain	3	15N	2E	7100	Verde #	
8 - S-2	Mogollon	2	115	19W***	7000	Frisco-Gila	
11-R-4	Mormon Lake	13	18N	8E	7350	Verde #	
11-R-3	Mormon Mountain(s) 14	18N	8E	7500	Verde	
11-R-1	Munds Park (s)	7	18N	7E	6500	Verde	
8-5-4	N-Bar Lake	16	105	17W***	8600	Gila	
8 - S -5	Negrito	6	10S	16W***	8200	Gila	
9-5-4	Nutrioso	23	6N	30E	8500	Salt-Frisco-Little Colorado	
9-5 -5		At to		verick, Ariz	. 7800	Salt	
9-N-1	Roof Butte	15	8N	6W****	8500	Little Colorado # Not read	d
10 -T -2	Rose Canyon	15	125	16E	7300	Gila	
9-5 -8	State Line	6	65	21W***	8000	Gila-Frisco	
7-5 -1	Taylor Creek	20	105	10W***	7850	Gila	
9-R -3	Trout Creek	5	7N	24E	6400	Salt Not read	d
8-N-1	Washington Pass La					Little Colorado # Not rea	d
13-P -1	Willow Ranch	16	21N	11W	5000	Williams	
10-R -1	Woods Canyon	15	11N	13E	7640	Salt-Little Colorado Disconti	inued
10-5-1	Workman Creek	33	6N	14E	6900	Salt	

^{*} Number indicates location of course within coordinate rectangle, thus 9-N 1 is Course *1 in coordinate rectangle 9-N.

^{**} All in Gila and Salt River Base and Meridian except where otherwise indicated.

^{***} New Mexico Principal Meridian.

^{****} Navajo Base.

^{*} On adjacent drainage.

⁽s) Soil Moisture Station installed on or in vicinity of course.

[§] Unsurveyed.

⁽p) Storage gage installed on or in vicinity of course

ARIZONA WATER SUPPLY OUTLOOK

March 15, 1957

- SNOW COVER: Only four courses reported snow. The three courses on the White Mountains above 9,000 feet and the course on the North Rim of the Grand Canyon. There were light snows in the mountains since the last readings, but these have melted. The snow remaining on top of the Mogollon Rim lays only in scattered drifts on the highest north slopes.
- SOIL MOISTURE: Soil moisture units show the soil to be at field capacity throughout the four-foot profile on all units. Many running seeps and springs are contributing to the flows of the rivers and show that soil moisture conditions are good in the mountain country.
- PRECIPITATION: Records from the U. S. Weather Bureau show that February has been dry throughout almost the whole State. This brings the water year average down to below average in most areas except those that had extremely high January precipitation.
- RESERVOIRED WATER: The reservoired water in the Salt River system was greatly benefited in the above average January and February runoff, which brought the stored water to 85 percent of average and 30 percent of capacity. The San Carlos Reservoir did not get the benefit of this early storm and now holds only $3\frac{1}{2}$ percent of the average amount of water for this time of year.
- STREAM FLOW: The Verde and Tonto River flows have kept up comparatively well even though most all of the snow has melted on their drainages. Most of the flow is now contributed to springs and seepage. They cannot be expected to yield above average flows as they did in January and February unless there is a late heavy storm.

The Salt River still has some potential runoff from the snow cover on the White Mountains. However, this area did not relatively benefit as much from the January storms as the Mormon Lake area. For the whole Salt and Verde River systems the March through May runoff is expected to be about 35 percent of a 15-year average.

The prospects in the Upper Gila and San Francisco Rivers have not improved and they are expected to yield only 15 percent of their average.

The Little Colorado River above Lyman also has poor prospects for much runoff, and its flow is expected to be far below average.

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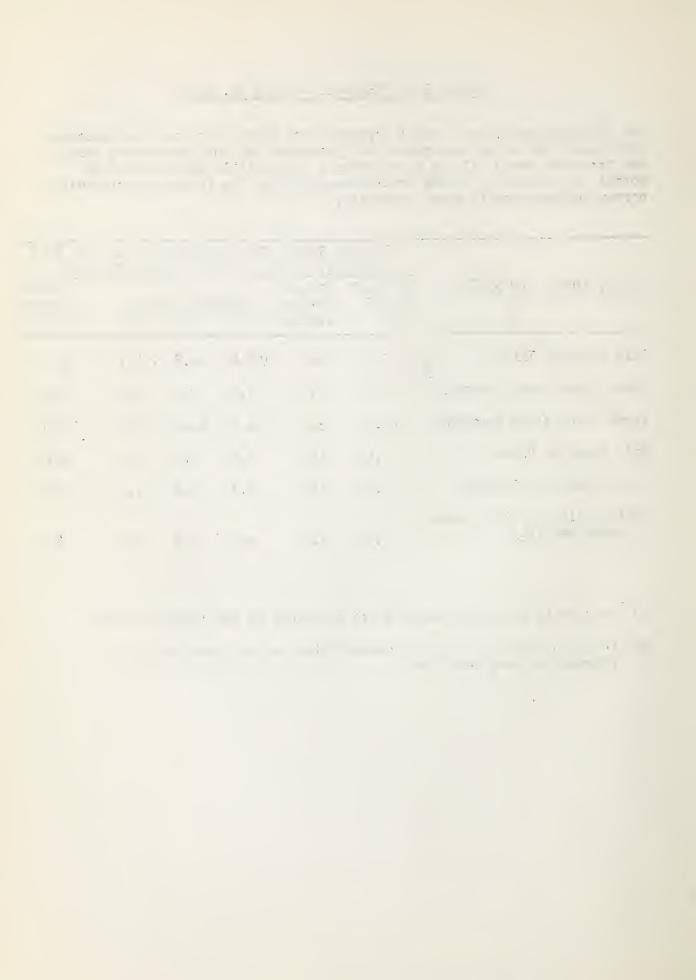
STREAM FLOW FORECASTS - MARCH 15, 1957

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature during the forecast period will be near average. Appreciable deviations from normal of temperature and/or precipitation during the forecast period will correspondingly modify these forecasts.

		L STREAM AST FERI			ANDS OF AY, INC	ACRE FEET LUSIVE
BASIN, STREAM AND STATION	Forecast Runoff 1957	Percent 15-Year Average	management and about the	red <u>Ru</u> 1955	-	15-Year Average 1933-52
Salt River at Intake	, 105.0	36	105.4	36.5	214.1	290,24
Tonto River above Rcosevelt	9.0	27	4.5	2.6	29.5	34.0
Verde River above Horseshoe	60.0	34	31.1	41.5	163.9	179.8
Gila River at Virden	7.5	16	6.0	6.7	20.7	46.5
Frisco River at Clifton	7.5	18	6.7	6,6	27.9	42.2
Little Colorado River above Lyman Dam 1/2/	1.0	11	sed on one	0.6	1.7	9.1

^{1/} Average is for less than 15 Years of Record in the 1938-52 Period.

^{2/} Forecast period for Little Colorado River above Lyman Dam is for February - June, inclusive.



STATUS OF RESERVOIR STORAGE - MARCH 15, 1957

			USABI	E STORAGE	- 1000 ACRE	FEET
BASIN and/or STREAM	RESERVOIR	USABLE CAPACITY 1000s AF	1957	1956	1955	15-Year Average 1938-52
Agua Fria	Lake Pleasant 1/	163.8	25.1	27.6	23.1	31.2
Colorado	Lake Havasu 1/	688.0	597.6	602.0	607.5	573.9
Colorado	Lake Mohave 1/	1,810.0	1,690.8	1,670.0	1,736.5	1,139.2
Colorado	Lake Mead	27,207.0	11,642.0	10,913.0	11,700.0	18,667.0
Gila	San Carlos	1,205.0	6.6	68,4	31.0	196.8
Verde	Bartlett <u>l</u> /	180.0	137.9	87,0	73.2	71.1
Verde	Horseshoe 1/	143.0	74.3	2.4	2.0	23.8
Salt	Roosevelt	1,381.6	172.0	244.2	434.2	471.8
Salt	Apache	245.1	128.4	233.3	243.4	190.6
Salt	Canyon	57.8	54.0	51.4	54.8	41.1
Salt	Saguaro	69.8	62.2	61.0	59.9	36.5
Little Colorado	Lyman <u>1</u> /	30.6	0.3	7.4	1.9	8.7
Little Colorado	Show Low Lake	5.1	0.7	0.5	0.2	

^{1/} Average is for less than 15 years of record in the 1938-52 period.

/ . s'

SUMMARY OF MARCH 15, 1957 SNCW SURVEYS AND COMPARISON OF DATA WITH THAT OF PREVIOUS YEARS BY WATERSHEDS

	No. of Courses	Snow Depth	Sn	ow Wat in I	er Con	Snow Density	1957 Water Content in		
WATERSHEDS	in Average	1957 Inches	1957	1956	1955	1938-52 Average	1957 Percent	Perce	ent of Avg.
Gila River	7	0	0.0	0.4	0.0	1.9	600 GB)	any and alle	alp 60 dig
Salt River	13	3	1.3	1.9	0.9	4.7	43	68	28
Verde River	8	0	0.0	0.3	1.2	3.8	***		
Williams River	1	0	0.0	0.0	0.0	1.2	60 60 60	00 00 M	00 00 dg
Lower Colorado River	4	8	3.5	1.8	3.3	5.6	44	19l _i	62
Little Colorado River	10	2	0.8	1.7	1.5	4.4	40	47	18

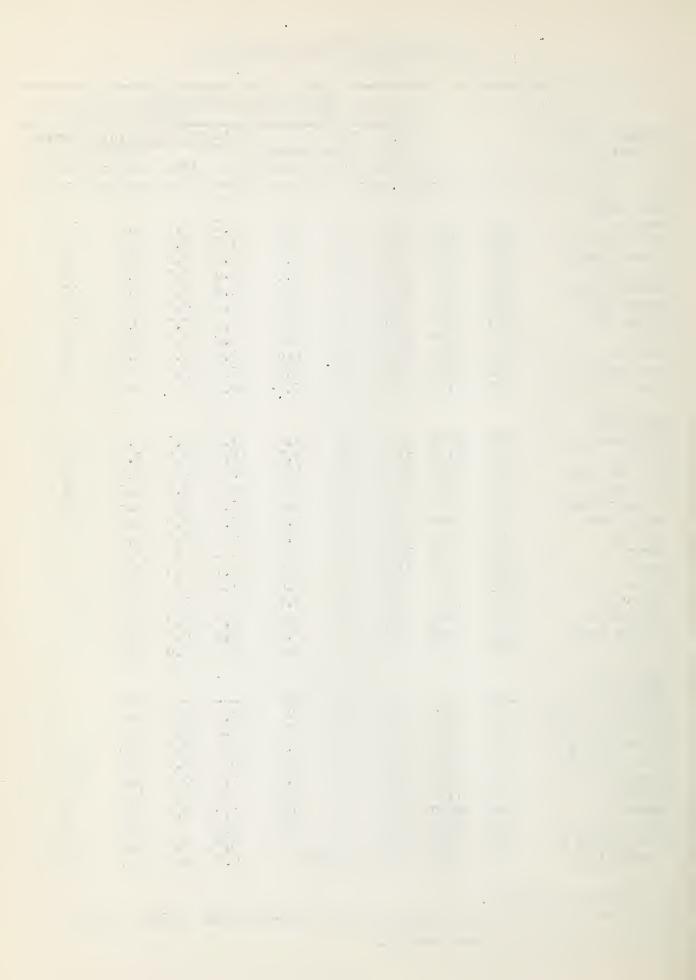


				SNO	OW COVER	MEASU	REMENT	PS .	
				195'	7		PAS	T RECORD	
DRAINAGE BASIN and SNOW COURSE	No.	Elev.	Date of Survey		Water Content (In.)	<u>Water</u> 1956	Conte	nt (In.) 1938-52 Average	Previous Yrs. of Record
GILA RIVER								2/	
Nutrioso Bear Wallow 3/ Frisco Divide State Line Coronado Trail Beaver Head Taylor Creek Inman Rose Canyon 3/ Mogollon 3/ Black Canyon 3/	954 1071 851 958 957 956 751 752 1072 852 753	8500 8100 8000 8000 8000 7850 7800 7300 7000 6790	3/14 3/14 3/14 3/14 3/14 3/14 3/14 3/14	0 0 0 0 0 0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.5 1.2 1.3 0.4 0.2 0.5 0.0 0.0 0.0	0.1 0.7 0.0 0.0 0.0 0.0 0.0 0.0	1.9 2.4 1.5 2.2 3.5 3.1 0.4 0.8 1.1	17 9 17 17 17 17 15 11 9 4
SALT RIVER Ft. Apache 1/ Baldy 1/ Maverick Fork Nutrioso 1/ Coronado Trail Beaver Head Pacheta Gentry 3/ Heber Canyon Creek McNary 1/ Milk Ranch Workman Creek Forest Dale	9R5 9S1 9S2 9S4 9S7 9S6 9S5 10R5 10R4 10R3 9R2 9R1 10S1 10R6	9160 9125 9020 8500 8000 7800 7600 7500 7200 7000 6900 6430	3/12 3/12 3/14 3/14 3/14 3/14 3/12 3/12 3/12 3/14 3/14 3/14	14 8 19 0 0 0 0 0 0	4.8 3.5 8.8 0.0 0.0 0.0 0.0 0.0 0.0	7.2 4.9 8.95 0.5 0.7 1.2 T 0.9 0.9	4.0 3.2 4.9 0.1 0.0 0.0 T 0.0 T 0.0	8.355595188195885 1.95188195885	7 7 7 17 17 17 17 7 7 7 17 16 5
VERDE RIVER Happy Jack 3/ Gaddes Canyon 3/ Mormon Mountain Mormon Lake 1/ Fort Valley 1/ Mingus Mcuntain Chalender Casner Park Munds Park Iron Springs 1/ Camp Wood 3/	11R5 12R4 11R3 11R4 11P2 12R3 12P1 11R2 11R1 12R2 12R1	7630 7600 7500 7350 7350 7100 6930 6500 6200 5700	3/14 3/15 3/13 3/13 3/14 3/15 3/15 3/13 3/13 3/11 Report	O T T O O O O O O O	0.0 T T 0.0 0.0 0.0 0.0 0.0 0.0	0.8 2.4 T 0.0 0.0 T 0.0 0.0	3.1 4.6 2.4 0.6 0.0 2.4 0.0 T	6.0 6.3 8.0 3.3 1.1 4.1 3.7 2.7 1.2 0.7	6 3 7 10 10 10 10 7 7 11

^{1/} On adjacent drainage.

^{2/} All averages are for less than 15 years of record in the 1938-52 period.

^{3/} Not included in watershed average.



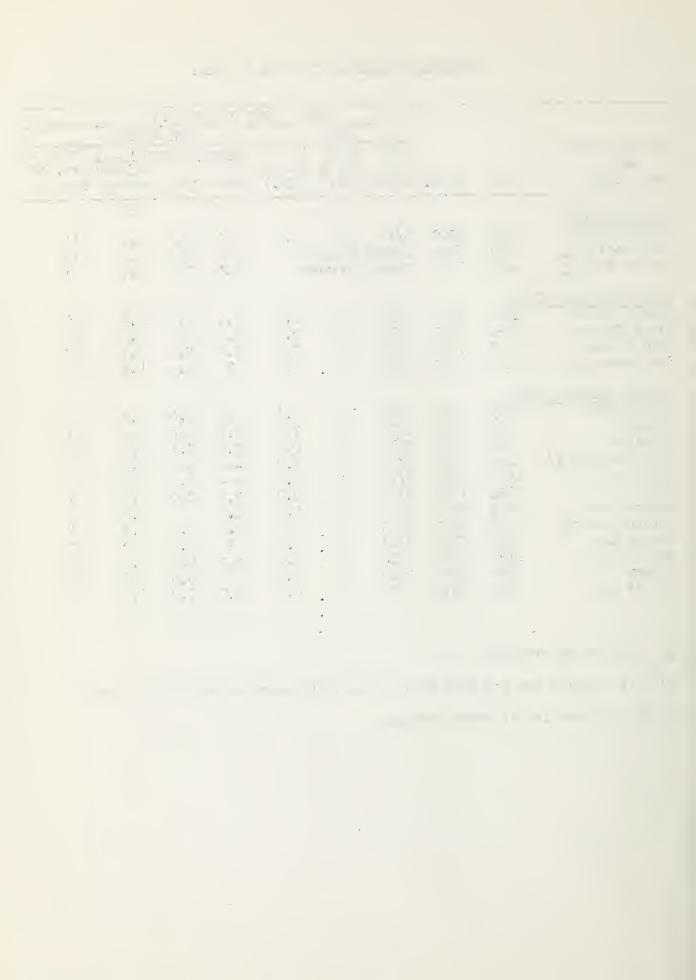
ARIZONA SNOW SURVEYS - MARCH 15, 1957

				S	NOT COVE	R MEAS	UREMEN	TS	
				1957				RECORD	
DRAINAGE BASIN			Date	Snow	Water		Conte	nt (In.)	Previous
and SNOW COURSE	7.7 _	17:3	of	Depth			3044		Yrs. of
ACTION COORDE	No.	FTev.	Survey	(In.)	(In.)	1956	1955		Record
WILLIAMS RIVER								2/	
Iron Springs	12R2	6200	3/11	0	0.0	0.0	0.0	1.2	11
Camp Wood 1/3/	12R1	5700		t Delay	red	0.0	0.0	0.7	11
Willow Ranch 3/	13P1	5000	Report	t Delay	red	0.0	0.0	0.1	11
LOWER COLORADO RIV	ÆR								
Bright Angel	12N1	8400	3/14	30	14.0	7.1	8.2	12.5	10
Grand Canyon	11P1	7500	3/14	0	0.0	0.3	1.9	2.4	10
Fort Valley	11P2	7350	3/14	0	0.0	0.0	0.6	3.3	10
Chalender 1	12P1	7100	3/15	0	0.0	T	2.4	4.1	10
LITTLE COLORADO RI	EVER								
Ft. Apache	9R5	9160	3/12	14	4.8	7.2	4.0	8.3	7
Baldy	981	9125	3/12	8	3.5	4.9	3.2	7.5	7
Nutrioso	984	8500	3/14	0	0.0	0.5	0.1	1.9	17
Happy Jack 1/3/	11R5	7630	3/14	0	0.0	en m-		6.0	6
Gentry 3/ Heber	10R5 10R4	7600 7600	3/12 3/12	0	0.0	0.7	0.0	2.8 3.1	7 7
Canyon Creek	10R3	7500	3/12	0	0.0	1.2	T	3.9	7
Mormon Mountain	11R3	7500	3/13	Ť	T	2.4	4.6	6.3	7
Mormon Lake	11R4	7350	3/13	0	0.0	T	2.4	8.0	10
Fort Valley	11P2	7350	3/14	0	0.0	0.0	0.6	3.3	10
McNary	9R2	7200	3/14	0	0.0	T	0.0	1.5	17
Forest Dale	10R6	6430	3/14	0	0.0	0.0	0.0	0.5	17

^{1/} On adjacent drainage.

^{2/} All averages are for less than 15 years of record in the 1938-52 period.

^{3/} Not included in watershed average.



PRECIPITATION AT SELECTED ARIZONA STATIONS 1

authority qualitation anniversi-auto-inversion contraction and a contraction of a		Precipitation	n (Inches)	
STATION	Febru	ery - 1957	Current Water-Year (Oct. 1956 - Feb. 1957)		
STATION	Total	Departure From Long Term Mean	Total	Departure From Long Term Mean	
Ash Fork	•39	80	4.92	+ .17	
Clifton	.75	15	3.38	69	
Douglas Smelter	.03	61	1.09	_ 2.02	
Flagstaff WBAS 2/	.85	89	8.43	+ .79	
Grand Canyon Hq.	•77	81	6,65	+ •57	
Parker	.12	57	•97	- 1.43	
Payson Ranger Station	1.26	- •95	10.76	+ 2.03	
Phoenix WBAS 2/	.21	58	1.85	- 1.38	
Prescett WBAS 2/	.70	63	4.46	64	
Springerville	.31	24	.73	- 2.12	
Tucson WBAS 2/	•36	56	3.22	50	
Winslow WBAS 2/	•66	+ .19	2,02	33	
Yuma WBAS 2/	•05	24	.71	92	

^{1/} Data and Analysis furnished by Paul C. Kangieser, Arizona State Climatologist, U. S. Weather Bureau, Phoenix, Arizona.

^{2/}WBAS = Weather Bureau Airport Station.

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LIST OF SNOW SURVEYORS

SNOW COURSE	SURVEYOR
Baldy	SCS and SRVWUA
Bear Wallow	A. F. Rea and J. R. Brinkley
Beaver Head	N. A. Josh
Black Canyon	Wayne Black
Bright Angel	Dee Bridges and George Epple
Camp Wood	Mrs. C. C. Merritt
Canyon Creek	SCS and SRVWUA
Casner Park	SCS and SRVWUA
Chalender	M. C. Oleson and T. A. Roll
Coronado Trail	J. D. McAdams
Forest Dale	R. E. Robinson, A. Valverde & R. Endfield
Frisco Divide	K. R. Weissenborn
Ft. Apache	SCS and SRVWUA
Fort Valley	Rocky Mt. Forest & Range Exp. Station
Gaddes Canyon	Richard Enz
Gentry	SCS and SRVWUA
Grand Canyon	J. Lynch
Happy Jack	Emil Ryberg
Heber	SCS and SRVWUA
Inman	C. H. McCauley
Iron Springs	Ernest Saxby
McNary	R. E. Robinson, A. Valverde & R. Endfield
Maverick Fork	SCS and SRVWUA
Milk Ranch	R. E. Robinson, A. Valverde & R. Endfield
Mingus Mountain	Richard Enz
Mogollon	J. R. Wray
Mormon Lake	SCS and SRVWUA
Mormon Mountain	SCS and SRVWUA
Munds Park	SCS and SRVWUA
Nutrioso	J. D. McAdams
Pacheta	Foch Phillips
Rose Canyon	A. F. Rea and J. R. Brinkley
State Line	K. R. Weissenborn
Taylor Creek	C. H. McCauley
Willow Ranch	Tiny Miller
Workman Creek	Rocky Mt. Forest & Range Exp. Station

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The following organizations cooperate in the Arizona snow survey work:

FEDERAL

Department of Agriculture Soil Conservation Service

Forest Service
Apache Forest
Coconino Forest
Coronado Forest
Gila Forest
Kaibab Forest
Prescott Forest
Rocky Mountain Forest and Range Experiment Station

Department of Commerce Weather Bureau Arizona Section

Department of Interior

Bureau of Reclamation Region III

Geological Survey
Arizona District

Bureau of Indian Affairs Fort Apache Reservation

National Park Service Grand Canyon National Park

Gila Water Commissioner Safford, Arizona

IRRIGATION PROJECTS:

Salt River Valley Water Users! Association Phoenix, Arizona

San Carlos Irrigation and Drainage District Coolidge, Arizona

SOUTHWEST LUMBER MILLS, INC., McNary, Arizona

Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

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Federal - State - Private COOPERATIVE SNOW SURVEYS

Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"